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FROZEN PACK VEGETABLES:

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U. S. Department of Agriculture

A radio talk prepared by H.C.Diehl, Senior Physiologist, in charge, Frozen Pack Laboratory of the Bureau of Plant Industry, U.S. Department of Agriculture, Seattle, Washington, and delivered by John L. Harvey during the Western Farm and Home Hour, Thursday, April 7, 1932, through Station KGO and seven other stations associated with NBC-KGO network, National Broadcasting Company.

In my first talk to you about frozen horticultural products, a short discussion dealing with frozen vegetables was promised. While the commercial distribution of the latter is not yet so far reaching as the spread of frozen fruits, many housewives have, no doubt, heard of frozen vegetables, particularly asparagus, peas, beans and corn. A certain optimism concerning the future development of frozen vegetable packing is no doubt justified, but a considerable measure of conservatism has tempered the growth of our enthusiasm for vegetables so preserved.

Practically every housewife will think of the reason; when she recalls that non-acid products, unless adequately preserved in containers, may undergo spoilage, which may not only render the material unfit for consumption but may make it a positive menace to public health. Considerable study has been made in past years of the behavior of the bacteria, responsible for this spoilage, with respect to preservation by heat. Until recently, practically no investigation had been conducted of the manner in which these germs react to low temperatures and ice formation.

Until some facts could be accumulated, caution has seemed the wiser course to follow. At present, the results of our studies are by no means complete, but enough evidence is at hand to indicate that if frozen pack vegetables should be, and are promptly frozen and held in that condition until the food product is to be utilized, no menace to health or loss of appetizing qualities need be anticipated. Let me repeat, however, that the vegetables should be kept frozen until they are wanted for use, in order that objectionable or harmful bacterial action may be prevented.

For some time now, commercially packed frozen vegetables have been marketed with reasonable success. Experimental frozen packs of eighteen different vegetables have been prepared and examined in our own Laboratory over a period of two years.

You may be interested in some of the facts which we are learning, even though you are not packers or distributors of frozen vegetables. Nowadays, housewives have learned a great deal about the products which they buy through the medium of modern advertising and are qualified for a discussion of the factors involved in food preservation.

First we have learned that scalding and subsequent quick cooling of the product, prior to packing, is desirable for almost all vegetables, although some of them, such as carrots, kale and okra apparently do not absolutely require it for the preservation of color and prevention of changes in flavor.

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While the hermetically sealed container, from which most of the air has been removed by vacuumization, was found to be most desirable for packing vegetables as well as fruits, it is not an indispensable factor, if the product is first scalded, and particularly if it is then packed with a dilute brine.

Exclusion of as much air as possible from the product by whatever means accomplished, is a necessary requisite of successful frozen packing.

With leafy vegetables, scalding tends to wilt the product somewhat so that it can be packed to better advantage. Lastly, though by no means least in importance, the scalding tends markedly to reduce the population of germs which are naturally present on all vegetables and which cannot be removed by washing alone.

Some few vegetables such as cucumber, eggplant and tomato have not given satisfactory results when preserved by freezing but others, like peas, beans, spinach, Brussel sprouts and kale have been prepared in such a way as to preserve to a high degree the color and characteristic natural quality, which are sought for in these vegetables when preserved by other methods.

While in general, many of the vegetables have been frozen satisfactorily at moderate freezing temperatures, an advantage has been observed for some at very low temperatures, because of the effect such temperatures have in making the products more tender and more quickly prepared for the table by heating.

During the examination of frozen vegetables, we have been impressed by the elimination of the waste in preparing the product for consumption and in many cases by the high degree to which the characteristic color, flavor and odor of the vegetable have been retained by freezing preservation.

The enumeration of a few additional vegetables satisfactorily preserved in our experiments may be interesting. Corn, cut from the cob, packed in brine, and held in airtight containers has been preserved with success, but particular attention must be given to the maturity of the product and to the manner in which it is handled after harvesting in order to accomplish this. The same fact is true of other vegetables, but particularly of peas, and any lapse in care of handling may spell the difference between failure and success in the marketing of the product.

Very recently we have examined experimental lots of corn frozen in large cans, husked and on the cob as well as with the husks left on. In some cases, brine was added to the husked corn, and in the latter packs we were agreeably surprised to find no trace of the so-called cob flavor. The exclusion of air from the corn during freezing and storage seemed to be very helpful in preventing brown discoloration of the cob as well as the off flavor, which seems to accompany it. We hope that further study will demonstrate that corn can be preserved in this way, thereby making available the epicurean delights of eating corn on the cob, even in the winter time.

Italian brocoli; Brussel sprouts, kale and cauliflower, when scalded and packed in brine have been regarded favorably by all who tested them, particularly when packed in airtight containers. The presence of brine, however, tends to improve matters if the container is not airtight by protecting the product from direct exposure to the atmosphere.

Parsnips, among the root vegetables behave in orthodox manner when preserved by freezing, although they do benefit by scalding before packing, a factor which carrots seem not to require. When artichokes are suitably put up in an acidified brine, their appetite appeal is hard to resist, and only a short boiling is necessary to make them ready for eating.

Spinach, that blessing which parents often bestow on their offspring while carefully avoiding it themselves, for obvious reasons, seems to be less objected to when preserved by freezing, if scalded and packed in brine. Only a short cook is needed, one not enough to cause the leaves to disintegrate. So prepared, the frozen pack spinach is sufficiently delectable that my three children call for second helpings, incredible as that may seem.

Finally, you may be asking the question "How shall we thaw the frozen vegetables before cooking?" As yet there is some difference of opinion regarding this and we can make no final recommendation. However, it has been our observation during our experiments that moderately rapid thawing with the container immersed in water at about room temperature or a little above, requiring an hour or so involves no significant deterioration in the product and makes it suitable for subsequent cooking in a uniform manner. When cooked while still in a frozen state the outer part of the mass seems to be cooked to a greater degree than the inner and may not be so high in quality.

In bringing this last frozen pack talk to a close, our interest in your experiences with frozen pack fruits and vegetables should not be left unmentioned. A radio talk is at best a one sided affair unless it stimulates the listeners to complete the mutual contact by an expression of opinion. Hence, we look forward to a response from you, whether you deputize the postman to deliver it or whether you bring it in person to the Laboratory during a visit to Seattle.

The opinions and observations given in the three talks first begun in February have not been uttered in a dogmatic spirit, because when an industry is as young as frozen pack for horticultural products, all those interested in its future still have much to learn. However, there is a belief with us that as the technology of this industry is developed, and I include in that phrase, equipment as well as methods, we shall eventually find this new method of preservation by freezing taking its place among the important ways of making perishable foods available in all seasons.

